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⑩ Dry cleaning process.

⑪ A soiled textile article with a visually dominant colour is dry cleaned using a dry cleaning solvent having a liquid vehicle dissolved in the solvent and a dye or pigment, which is substantive for fibres constituting the article, dispersed in the liquid vehicle (the latter vehicle being preferably a detergent).

The dye or pigment is such that it colour-matches the visually dominant colour of the article; this causes restoration of the perceived colour of the article, giving it a fresher, cleaner appearance.

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Dry cleaning process

The present invention is concerned with a process for dry cleaning soiled textile articles, in particular, textile articles having a visually dominant colour.

5 Textile articles, such as upholstery fabric, curtains and articles of clothing, are conventionally dry cleaned in a dry cleaning machine using a dry cleaning solvent comprising a chlorinated and/or fluorinated hydrocarbon, or a hydrocarbon solvent. Examples of
10 conventional dry cleaning solvents include carbon tetrachloride, ethylene dichloride, perchloroethylene, trichlorofluoromethane, tetrachlorodifluoroethanes, dichlorotetrafluoroethanes, trichlorotrifluoroethanes, or mixtures thereof, and hydrocarbon solvents such as
15 solvent naphtha.

While such a dry cleaning process generally results in satisfactory cleanliness, improvements in the process are continually being sought.

According to the present invention, there is
20 provided a process of dry cleaning a soiled textile article having a visually dominant colour, the dry cleaning being effected by means of a dry cleaning solvent in one or more stages, the solvent having dissolved therein, in at least the last stage, a liquid vehicle in which is
25 dispersed a dye or pigment which is substantive for fibres

constituting the article, the dye or pigment being such that it colour-matches the visually dominant colour.

In the case of an article having a single colour, the visually dominant colour is, of course, that 5 single colour; in the case of an article having a plurality of colours, one of the perceived colours is often perceived as appearing to have a greater colour intensity than other colours and it is this perceived colour which is visually dominant. The visually dominant 10 colour is often the background in, for example, upholstery fabrics having a plurality of colours.

The process according to the invention results in restoration of the perceived colour (or visually dominant colour) of the cleaned article, which gives the 15 latter a fresher, cleaner appearance.

The liquid vehicle in which the dye or pigment is dispersed is preferably a detergent liquid which is soluble in the dry cleaning solvent; an example of such a detergent liquid is available commercially under the 20 trade mark Fluoradet. Such detergent liquids are conventionally added to the dry-cleaning solvent before and during dry-cleaning.

The detergent liquid is preferably anionic, non-ionic, or a mixture thereof. (Cationic detergent 25 liquids are not preferred, because it is preferred to use an anionic dye in the process according to the invention, and such dyes would have undesirable reactions with cationic detergent liquids). Examples of suitable anionic and non-ionic detergents are given in British 30 Specification 1307318; an example of a preferred non-ionic detergent liquid is sorbitan mono-oleate.

The detergent liquid is generally used in a very low concentration, such as less than about 5 ml. per litre of dry cleaning solvent. A typical amount used is 35 in the range 100 to 200 ml. per 60 litres of dry cleaning solvent.

The dye or pigment dispersed in the detergent liquid (in undissolved form) is preferably an anionic dye, such as an Aniline dye. Suitable dyes of this type are commercially available under the trade mark Nylomine 5 (this trade mark is used for a range of water-soluble anionic reactive dyes).

When an ionic dye is used, it preferably has a pH within two units (more preferably within one unit) of that of the fibres being treated. Thus when the 10 fibres have a pH of, say, 4-6, the dye bath preferably has a pH in the range 4 to 5, or 6.

The amount of dye or pigment used is substantially less than would be used in a conventional dyeing process because the purpose of the dye is merely 15 to restore or enhance an existing colour. A typical proportion of dye for use according to the invention is up to 1.5 grams per litre of dry cleaning solvent.

Loss of dye or pigment in the process according to the invention can be minimal; for example, 20 about 98% (or more) of the dye or pigment not taken up by the textile article can be recovered from the dry cleaning solvent. This represents a considerable advantage over sequential dry cleaning and dyeing (the latter is normally carried out using an aqueous medium, 25 from which it is generally more difficult to recover the dye).

The process according to the invention can be employed for any conventional textile material, such as polyamides, polyesters, wool, acrylics, cellulosic 30 materials, and even polypropylene, which is notoriously difficult to colour. The fibres preferably have a pH not exceeding 3.

The process according to the invention is preferably carried out in a sealed dry cleaning machine 35 (which is preferably a conventional sealed unit) and not

in situ in the case of, for example, upholstery fabric and curtains, since the immersion of the textile in dry cleaning solvent containing dissolved liquid in which a dye or pigment is dispersed ensures even penetration 5 of the fabric and even colour restoration.

When the process according to the invention is carried out in a sealed dry cleaning machine, the dye or pigment is preferably added to the dry cleaning solvent in a final rinse stage only. In this case, the dye or 10 pigment is preferably added in the form of a concentrated dispersion in a detergent liquid; such a dispersion preferably contains 30 to 100 grams of dye or pigment per litre of detergent liquid.

The dry cleaning solvent and the liquid 15 vehicle dissolved therein may additionally contain materials such as antistatic agents, flame retardants, biocides and/or perfumes; treatment which might previously have been carried out in several stages can advantageously be carried out according to the invention in a single 20 stage.

When the textile article being dry cleaned according to the invention has previously been provided with a flame-retardant finish, it is particularly preferred that a concentrated dispersion of dye or pigment in a 25 detergent liquid (added during the final rinse stage as described above) contains dispersed or dissolved flame retardant material. This is because it has been found that staining of textile material often causes deterioration of an existing flame retardant finish; the flame 30 retardant properties of the textile article can be restored according to the invention at the same time as the article is cleaned.

The cleaned article obtained according to the invention can have a restored colour which is fast to 35 water, acid, alkalies, perspiration, washing, wet and

dry rubbing and Xenon light.

The present invention is illustrated by the following Example.

Example

- 5 An industrial dry cleaning machine was loaded with soiled wool-based upholstery fabric having a red/orange pattern (of which the red was visually dominant).
- 10 The fabric was subjected to a conventional washing cycle, using 60 litres of a dry cleaning solvent based on 1,1,2-trichloro 1,2,2-trifluoroethane, and then spun dry.

The fabric was then subjected to a rinsing cycle, using 60 litres of the same dry cleaning solvent as used in the first cycle. During the rinsing a solution of 100 ml. of sorbitan mono-oleate in 1,1,2-trichloro 1,2,2-trifluoroethane, the solution having dispersed therein 0.5 g. of a red Aniline dye (available commercially as Nylomine Red C-3B).

- 20 Two litres of Protiflam (a commercially available flame retardant material) was added to the solvent at a subsequent stage of the rinsing cycle, and the fabric was then spun dry.

The resulting cleaned fabric had a restored red colour, and a cleaner fresher appearance. The cleaned fabric also had its flame retardant properties restored. The fabric passed the following tests of British Standard 1006 (1978); E07, E04, E03, X12 and B02, and a special wash test designated ISO3 (Marks and Spencer).

CLAIMS

1. A process of dry cleaning a soiled textile article having a visually dominant colour, the dry cleaning being effected using a dry cleaning solvent in one or more stages, the dry cleaning solvent containing, in at least the last stage, a dye or pigment which is substantive for fibres constituting the article and which colour-matches said visually dominant colour, the dye or pigment being dispersed in a liquid vehicle which is itself dissolved in said solvent.
2. A process according to claim 1, in which the dye or pigment is present in said solvent in an amount not exceeding 1.5 grams per litre.
3. A process according to claim 1 or 2, in which said liquid vehicle is a detergent liquid.
4. A process according to any of claims 1 to 3, in which the dry cleaning solvent also contains an antistatic agent, a flame retardant, a biocide, a perfume, or a mixture of two or more thereof.
5. A process according to any of claims 1 to 4, in which the textile article is soiled upholstery fabric which has been removed from furniture.
6. A process according to any of claims 1 to 5, which is carried out in a sealed dry cleaning machine.
7. A process according to claim 6, in which the dye or pigment is present in the dry cleaning solvent only in a final rinse stage.

